BOOK REVIEW

TSCHIRNHAUS, M. von 1981. Die Halm- und Minierfliegen im Grenzbereich Land-Meer der Nordsee. Eine ökologische Studie mit Beschreibung von zwei neuen Arten und neuen Fang- und Konservierungsmethoden (Diptera: Chloropidae et Agromyzidae). Spixiana, Supplement 6. 405 pages containing 89 tables and 25 diagrams; 11 plates of photographs.

This work presents part of the results of a recently completed doctoral project commenced in 1965. The length of time required to complete the project is explained by the fact that over half a million flies had to be identified. Tschirnhaus originally undertook a quantitative ecological study. What he has produced is much more. For, unlike most quantitative ecologists, he has not been content with unreliable species determinations or aggregation of his data according to genera or broader taxonomic units. Identification problems encountered during this project have prompted him to undertake the taxonomic research necessary to solve them. As a result he has emerged not only as an outstanding ecologist but also as one of the leading taxonomic specialists on the Agromyzidae and Chloropidae.

Tschirnhaus' study sites include tidal salt marshes, dykes and brackish water reservoirs along the west coast of Schleswig-Holstein and Denmark. Comparisons are made between grazed and ungrazed land, as well as between different plant communities. The sampling methods include the rearing of adults from collections of larvae and from vegetation samples isolated in the laboratory, and field trapping with sweep nets, coloured trays, emergence traps ("photoeclectors") and wind funnels.

Since coloured tray traps have not been used before in quantitative studies of small Diptera, this technique and the interpretation of its results are discussed at length. A new technique for producing microslides for preserving the genitalia of taxonomic specimens is also described. This involves use of a viscous embedding medium ("Zeiss W 15") which is enclosed in a rigidly hardening medium called "Eukitt". This technique should be tried by workers on very small insects whose genitalia are too easily lost when stored in microvials.

The sampling data has been analysed from the following synecological aspects: flight season, dominance dynamics, comparative abundance in coastal and inland regions, distribution according to habitat type, dispersal intensity, sex ratio, activity level and population size. The comparison with inland regions discloses some results of the author's studies in Norway and the Alps, as well as at inland localities in Schleswig-Holstein. The analysis of dispersal also uses data from three lightships moored in the North and Baltic Seas.

Surprising differences between species in all the above parameters are revealed by Tschirnhaus' analysis, which thus demonstrates the inadequacy of the usual ecologists' approach of sorting samples only to broad taxonomic units. For instance, the colour tray data show that uniform colour preferences cannot be assumed for closely related species or even for the sexes of the same species. Likewise there is no uniformity in activity response to weather changes, a few species showing unexpected behaviour such as increasing their flight activity under steady rain. Of particular interest to biogeographers is the demonstration that dispersal of these small flies in "aeroplankton" has nothing to do with the effects of storms, but is a voluntary phenomenon occurring during fine summer weather among species whose population densities have become high. Species which did not achieve high population densities were rarely taken far from their breeding habitat, no matter how wind exposed.

Following his synecological discussions Tschirnhaus presents taxonomic and autecological treatments of ten species of agromyzids whose larvae feed on halophytes (namely *Aster tripolium, Artemisia maritima, Atriplex* spp., *Triglochin* spp. and *Juncus gerardii*). These

treatments are extremely detailed and include a complete critical review of previous literature. Two of the fly species (*Napomyza maritima*, a stem-borer in the *Artemisia*, and *Metopomyza junci*, a leaf-miner on the *Juncus*) are new to science. The description of the new *Metopomyza* is preceded by a discussion of other species of this little studied genus, in the course of which an expanded description is given of the Canadian *M. griffithsi* Sehgal (Edmonton, known only from the holotype).

Evidently this publication still presents only a small part of the new taxonomic information accumulated during Tschirnhaus' studies, since we are promised further publications describing eight more new agromyzids and four new chloropids listed as nomina nuda. It is to be hoped that these further publications will be available as soon as possible, since it is not satisfactory to have published information associated with nomina nuda.

Tschirnhaus' work needs to be brought to the attention of Canadian entomologists because of its possible relevance to the survey of prairie insects which the Biolgical Survey of Canada is planning. His sampling methods have been developed for exclusively herbaceous vegetation (some tall, some very short due to heavy grazing), physically comparable with that of our praireis. So his conclusions on the usefulness and comparability of various methods are relevant to the design of any quantitative sampling for the prairie insect survey. I recommend those involved in organizing the survey to read Tschirnhaus' work.

I am confident that this publication will become recognized as a classical work of its kind, one which will set the standard for future ecological studies on phytophagous Diptera. Well done!

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